

## ABSTRACT

5 A system for separating a multi phase mixture into a  
first liquid phase component, a second liquid phase component  
and a solid phase component includes a three phase centrifuge  
and a control system for the centrifuge. The control system  
includes a fuzzy soft sensor programmed with fuzzy logic  
rules and a feed forward controller in signal communication  
10 with the fuzzy soft sensor. The feed forward controller is  
configured to adjust a feed rate and a feed temperature of  
the mixture based on the rules, the cold feed temperature,  
the percent change of water in the mixture, and the percent  
change of solids in the mixture. The system also includes a  
15 feedback controller configured to adjust the feed rate and  
the feed temperature of the mixture based on the rules, and  
the basic water and solid (BS&W) content of the first liquid  
phase component.

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